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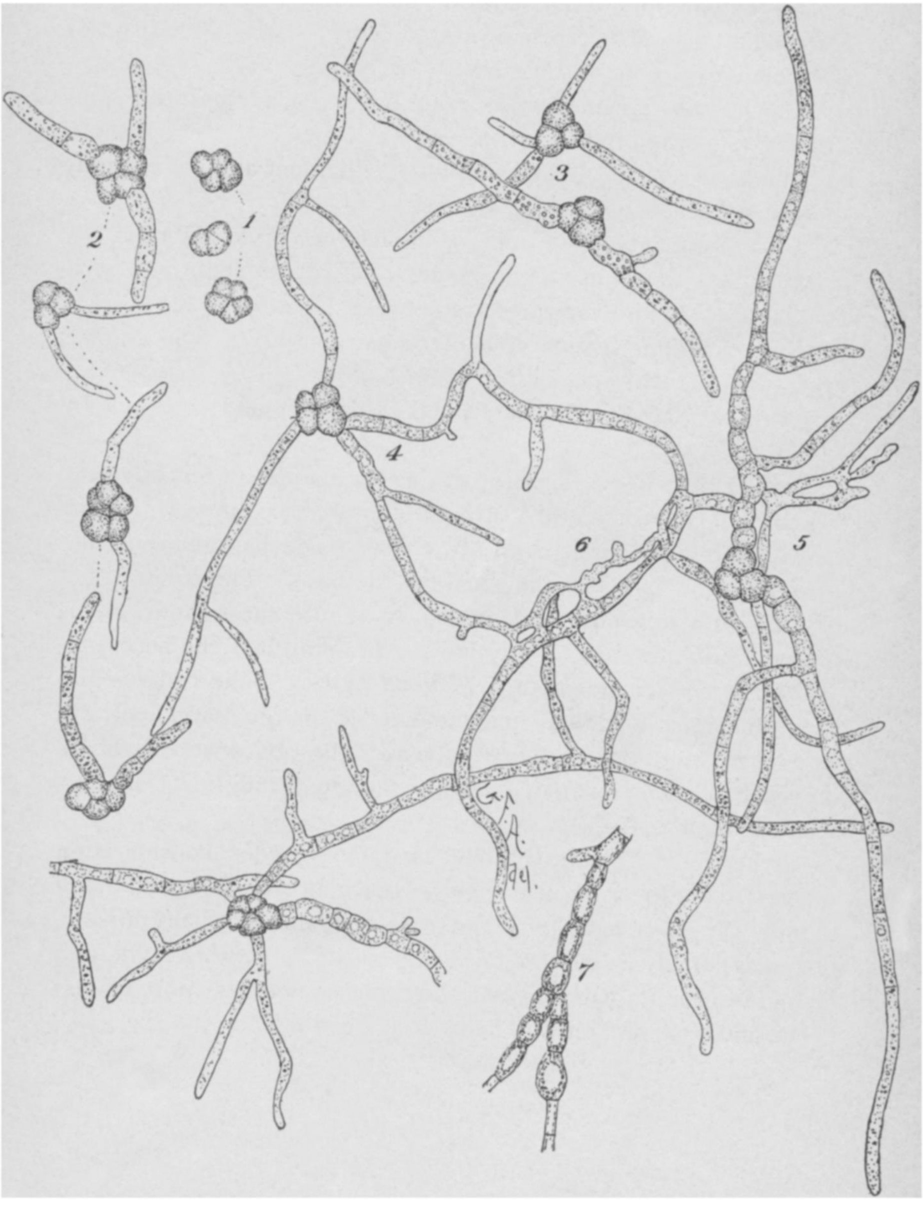

GERMINATION OF THE SPORES OF CEREBELLA PASPALI.

Germination of the Spores of Cerebella Paspali.

BY GEO. F. ATKINSON.

(PLATE 183.)

Specimens of *Cerebella Paspali* C. & M. were collected by the the writer in August, 1891, at Auburn, Ala., on *Paspalum platycaule.* Since there is some doubt as to the relationship of this genus to the other genera of the Ustilagineæ, it seemed well in the spring of 1892 to undertake the germination of the spores, that their behavior under those circumstances might be observed.

Cultures were made in Van Tieghem cells in water, and the development of the mycelium carefully traced. The first sowing was made April 2d, and in twenty-four hours the spores were germinating, as shown in figures 2 and 3. One or all of the cells of the glomerules, or spore balls, may germinate. The germ tubes are rich in granular protoplasm, and are also abundantly supplied during their early growth with quite numerous highly refringent granules. Septa arise also quite early, dividing the threads into cells, which are at first in length two or three times their diameter. Later they may become shorter by further division. These threads, which are homologous with the promycelium of the Ustilagineæ in common, do not seem to function as promycelia in the ordinary sense, *i. e.*, they do not bear sporidia. On the other hand, quite an extended weft of mycelium is developed and the threads branch profusely. Frequently, where threads or their branches from the same spore ball or from different spore balls come in contact fusion takes place in the same manner as in the mycelium of many of the pyrenomycetous and hyphomycetous fungi. Figures 4 and 5 show quite an extended growth of mycelium from two spore balls, which at figure 6 is fusing in several places. In a few days vacuoles appear in the protoplasm of the thread cells, which become more and more prominent with the age of the thread. At the same time the older cells become strongly constricted at the septa, so that the individual cells, which are now shorter by the formation of intermediate septa, are nearly oval in form. Also the mycelium now begins to darken and in the cell cultures became of a reddish brown color much the same as the color of the mycelium found in the sori at the maturity of the fungus on its host.

Dilution cultures for the separation of the fungus were started in ordinary nutrient agar-agar. The spores germinated well, but no sporidia were developed, and in the course of a week a portion of the mycelium was transplanted to dead cornstalk pith which had been saturated with agar. Here the fungus grew profusely, but did not fruit, the substratum probably being not of the proper nature to encourage the normal development of the plant. After two weeks' growth the mycelium was examined, and a small portion of it is represented in figure 7. The older portions now present a moniliform appearance, the cells possessing very large vacuoles and the walls being very brown in color.

The genus *Cerebella* was first described by Cesati from specimens on *Andropogon Ischæmi* in Italy, and was supposed to be related to certain of the Hyphomycetes, as *Sporodesmium*.* Berkley† suggested its relationship with *Polycystis*. De Toni ‡ places it among the Ustilagineæ, and suggests its close relationship with *Urocystis* or *Thecaphora*. The appearance of the spore balls suggests a much closer relationship with *Thecaphora* than with *Urocystis*, but the germination of the spores does not show a very close relationship with either, and the mycelium from the spore is very different from the promycelium of either *Urocystis* or *Thecaphora*. The failure to produce sporidia would not form a very strong argument against the location of this plant in the Ustilagineæ, since Brefeld § found that the dusty smut of barley and the smut of wheat did not in nutrient solutions produce sporidia. But certain characters of the mycelium would seem to favor its exclusion from the Ustilagineæ, but this will be still a matter of doubt until the other species of the genus have been studied.

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* Saccardo Syll. Fung. 4 : 761.

† Gardeners' Chronicle, 1852, 643.

‡ Sacc. Syll. Fung. 7 : 2, 515.

§ Journ. Mycol. 6 : 1890–91, 153 (translation from the Nachrichten aus dem Klub der Landwirthe zu Berlin, Nos. 220–222).